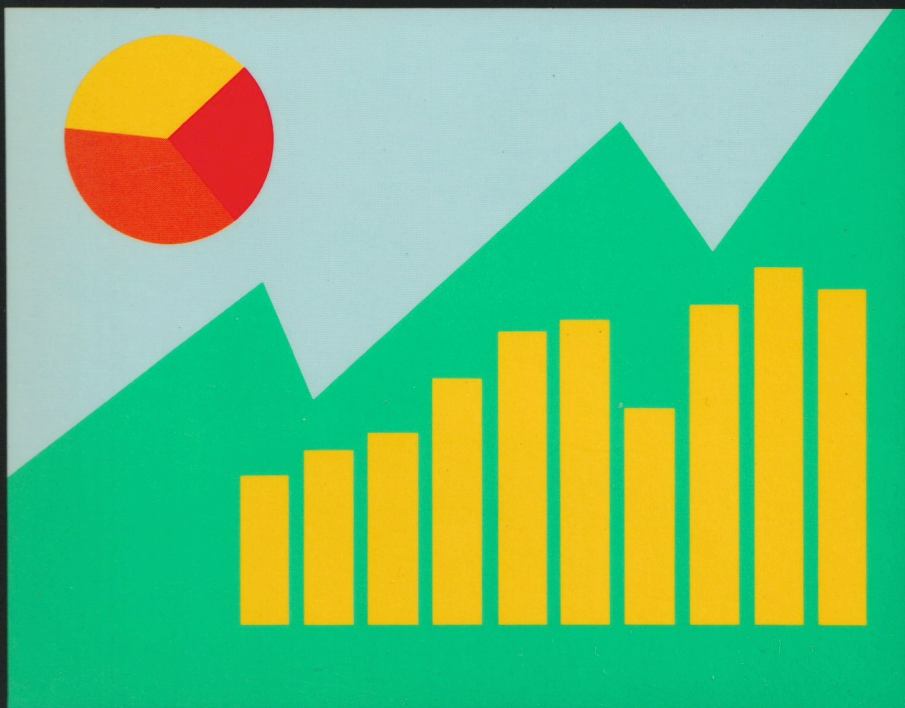


ACORNSOFT
The choice of experience
in software.

ViewPlot

for the British Broadcasting Corporation Microcomputer





ViewPlot

for the British Broadcasting Corporation Microcomputer

User Guide

ACORNSOFT

The choice of experience
in software.

This User Guide was written by Peter Cockerell using the VIEW Word Processor.

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British Broadcasting Corporation has been abbreviated to BBC in this publication.

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Contents

1 Introduction	1
A note on typefaces	2
2 Elementary plotting	3
Getting started	3
Entering data	4
Plotting the data	8
3 More on data entry and plotting	10
Auto entry	10
Loading and saving	10
Adding and removing data entries	11
Jumping to an entry	11
Reading ViewSheet files	11
Issuing * commands	11
Erasing the data set	12
The plot screen mode options	12
Changing the colours of a graph	14
Dumping and printing	14
4 Format files	16
Creating format files	17
Plotting more than one graph	17
Plotting multiple data sets	18
The function keys when editing the format file	19
Chaining files	19
Rules for multiple data sets	20
5 Using ViewPlot with ViewSheet	21
The *PREPARE utility	21
ViewSheet link files	23

6 Using the pattern editor 26

Entering the pattern editor	26
An example session	26
Other facilities	29

7 Errors in ViewPlot 31

Main menu errors	31
Data editor errors	31
Format editor errors	32
Graph plotter errors	32
Pattern editor errors	33

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1 Introduction

This Guide describes the ViewPlot graph-drawing utility. ViewPlot is a member of the VIEW family of business software. Other members include the word processor VIEW, the spreadsheet program ViewSheet and the database manager ViewStore.

Using ViewPlot, you can draw line graphs, pie charts and bar charts (histograms). Data for the charts may be derived from several sources: you can enter figures manually, use information from text files, or read data directly from ViewSheet link files. Presentation of the graphs and charts is flexible: you may choose between high resolution, medium resolution and low resolution displays with varying numbers of colours. Other options include whether solid colours or patterns are used to draw bar and pie charts, and whether a border is drawn around the chart.

Hard copy of graphs may be obtained on printers which are compatible with the Epson FX80. A screen dump utility for this printer is included in the package. It is possible to obtain hard copy using different printers by providing your own screen dump routine. Charts may also be saved on to disc and loaded by other programs at a later time.

Unlike some other members of the VIEW family, which are supplied in a ROM chip, ViewPlot is disc-based. That is, the programs which comprise ViewPlot are loaded into your computer from the floppy disc supplied with this manual.

Chapter 2 introduces you to ViewPlot. It gives a complete example of entering data from the keyboard and displaying it in various ways. The example by no means illustrates the full power of ViewPlot, but serves as an introduction to the facilities which are explored more fully in later chapters.

Chapter 3 covers much the same ground, but in more detail. It explains some of the subtleties of plotting charts with ViewPlot, and describes the various plotting options in greater depth.

Chapter 4 shows how you can combine several sets of data using a format file. With this facility, you can produce a slide show of graphs and charts, eg for use in a year-end presentation of results versus projected figures.

Chapter 5 discusses the use of ViewPlot with the ViewSheet spreadsheet program. There are two ways in which ViewSheet data can be passed to ViewPlot. The first is using a text file of figures which are read into ViewSheet as though they had been typed by the user at the keyboard. In fact, using this

facility, any program which can be made to generate results in a simple tabular form may be used to provide ViewPlot data. The second way is to use ViewSheet link files.

Chapter 6 describes the pattern editor. This is a rather esoteric aspect of ViewPlot, and will only be of interest to some readers.

A note on typefaces

In this Guide, bold characters are used to represent the names of special keys. For example, the statement

Press **RETURN** when you have finished

means press the key marked **RETURN**, not the separate letters R E T U R N. Similarly, **f0** denotes the red function key bearing the legend **f0**. A special typeface is used to denote text which is displayed on the screen or typed at the keyboard. An example is the prompt:

File to load:

If you see a word in computer typeface italics the word is not to be taken literally: the word represents a class of things. For example, when the error message

Data set *filename* not found

appears, a particular file name will appear in place of *filename*.

2 Elementary plotting

In this chapter, we describe how to call up the ViewPlot package, how to enter data into it, and how to display this data in various formats on the screen.

Getting started

To enter ViewPlot, insert the disc supplied with this manual into the disc drive. Hold down the **SHIFT** key. Press and release the key marked **BREAK**, then release **SHIFT**. The disc drive will be activated (indicated by the drive light glowing), and after a short pause, a menu will be displayed. This menu is the central part of ViewPlot, and you will find yourself returning to it when you leave any of the other sections.

The picture below shows the menu screen.

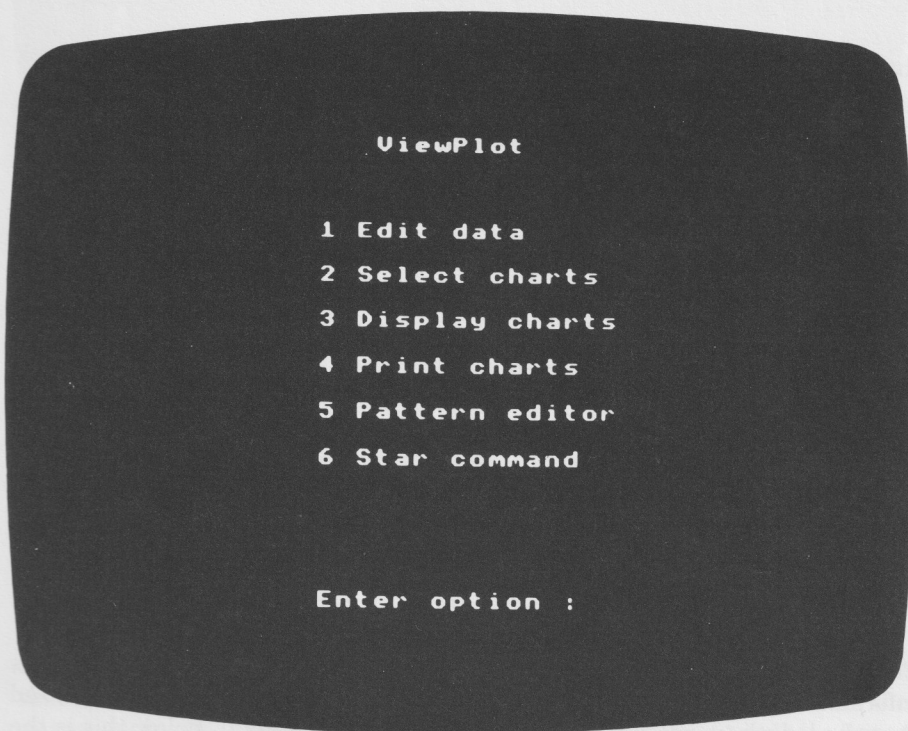


Fig 2.1 – The menu screen

To choose one of the items, type a digit between 1 and 6. There is no need to press **RETURN** as well; as soon as the digit is typed, the appropriate part of ViewPlot will be called.

Although there appear to be a large number of options on the menu, two of them are variations on a single theme. Option 1, which we will use shortly, is used to prepare data for plotting. The second option will be explored in the next chapter, and is used when we wish to display multiple graphs, or graphs with more than one set of data.

Options 3 and 4 perform the same function – display a graph or chart. The difference is that option 4 also automatically ‘dumps’ each graph or chart to a printer, while option 3 allows us to choose to ‘dump’ to printer or disc for each graph or chart.

The fifth option invokes the pattern editor. When patterns are used instead of solid colours, it is possible to draw histogram bars and pie chart segments as textured areas. This is particularly useful in the two-colour screen modes, as it effectively gives us more colours with which to differentiate between segments and bars. Although there are several built-in patterns, the editor enables you to design your own. The usefulness of patterns will become clearer in the next chapter when we will use them.

Finally, option 6 allows the use of ‘star’ commands such as *CAT. Most readers will be familiar with the many * commands provided by the computer. These have a wide range of effects. Press 6 and the screen will clear, and you will be prompted with a * character. This signifies that anything you type will be treated as a * command. So, to issue a *CAT command, type

CAT RETURN

After the catalogue has been produced, you will be prompted with * again and you can continue typing * commands. To return to the main menu, simply press **RETURN** on its own in response to the * prompt.

Entering data

Before we can plot a graph, it is necessary to enter some data. This is done using the first option on the menu. So, press the figure 1 on the keyboard. The disc will spin while the data entry program is loaded.

The data entry screen is shown on the next page.

The screen is divided into three sections. The top two lines are status information. The top line tells us that we are in the Edit Data Set program, and that the length (ie the number of data items) is currently 0. Below this is the flashing cursor, where characters typed at the keyboard will appear, and on the right are the words Auto Entry, which will be explained later.

Edit Data Set **Length: 0**
Auto Entry

Title			
Labels name			
X-axis name			
Y-axis name			

	Labels	X	Y
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Fig 2.2 – The data entry screen

The smaller box contains four pieces of information about the data set. The term 'data set' just refers to a collection of figures to be displayed on a graph and stored together in a file.

The larger box contains the actual values for this data set. At most, 15 sets of figures are displayed at once, though a data set may contain up to 100 entries. The box forms a window into the list of entries, a concept which will be familiar to users of VIEW and ViewSheet. The large cursor in the Labels column of entry 1 indicates where the next item to be typed will be placed.

Before we start to type entries, we should understand the meanings of the three columns and how they are used by the graphs. We will consider the three types of ViewPlot chart in turn. Firstly, line graphs. These plot sets of points specified by their X and Y coordinates. For example, X could be time and Y might be distance. In the X and Y columns we would enter a list of two or more time values (usually, but not necessarily, equally spaced), and their corresponding distance values. When a line graph is plotted from these figures,

the axes are drawn and the points denoted by the X and Y values are joined with straight lines.

The second type of chart, bar chart, uses the Labels and Y entries. A bar chart plots one or more entries as vertical rectangles whose heights are proportional to the Y values. For example, the Labels might be the month name, and the Y value the sales for that month. To make a bar chart for one year's sales, 12 Labels and Y entries would be entered, and the X column ignored.

Pie charts are similar to bar charts, except that the Y entries are used to divide up a circular area representing the total. The Labels entry is used to mark each slice of the pie. A typical pie chart application would have the Labels column consisting of names of computer manufacturers, and the Y column giving their respective market shares.

In order to illustrate each type of chart, we will enter an example which uses all three columns. The Labels field will be the name of the month, from January to December; the X value will be the month number, from 1 to 12, and the Y value will be twice the X value. Such a set of figures might represent the turnover of a company which is experiencing very promising and steady growth.

Type the word Jan. (We will use three-letter abbreviations to save typing.) Notice that the characters you type are shown on the second line of the display where the small flashing cursor can be seen. If you make a mistake while typing a value, you may use **DELETE** to erase the last character. Press **RETURN** to enter the word. It will be printed in line 1 of the Labels column, and the long cursor will move automatically into the X column. For the X value type the month number, ie 1 **RETURN**, and then twice the month number (2 **RETURN**) for the Y value. The long cursor is now back in the Labels column.

Continue entering the values for the rest of the year. If you make a mistake, but only realise after you have pressed **RETURN**, all is not lost. To retype any entry, simply move the long cursor to it and retype the value. The long cursor is moved by pressing one of the four cursor control keys, marked \uparrow \downarrow \leftarrow and \rightarrow . The cursor may be moved at any time, even in the middle of typing a value.

When you have finished typing the year's entries, press the **TAB** key. The large cursor will move to the upper box, next to the row labelled Title. The four entries in this box give names to the various labels which appear on the charts. The title is printed at the top right of the chart when it is plotted. Enter a suitable title, eg Sales and press **RETURN** as usual. Note that entries in the upper box may be up to 11 characters long.

The second entry is the label name. This is used when bar charts and pie charts are plotted, and is used to give a name to the items which appear in the Labels columns. It is printed in the bottom right corner of the chart. An obvious name

for this example is **Month**. The next entry is used when line graphs are plotted, and is printed next to the graph's X-axis. Type **Month Num RETURN** for this. Finally, the label for the Y-axis of a line graph is required. Type **Turnover RETURN** for this one.

At last we have given all the information required. In fact, when you are used to the way in which data is entered, it is very quick. If you want to save a little time, you can omit the items in the upper box and plot the chart without the various labels. You can always come back and add them later. As a final check, the picture below shows what the screen should look like after you have entered the Y-axis name.

The screenshot shows a terminal window titled "Edit Data Set" with a "Length: 12" indicator and an "Auto Entry" status. Below the title bar is a table with three columns: "Labels", "X", and "Y". The "Labels" column lists months from January to December. The "X" column contains numerical values from 1.00 to 12.00. The "Y" column contains numerical values from 2.00 to 24.00. The table is displayed on a dark background with white text.

Labels	X	Y
1 Jan	1.00	2.00
2 Feb	2.00	4.00
3 Mar	3.00	6.00
4 Apr	4.00	8.00
5 May	5.00	10.00
6 Jun	6.00	12.00
7 Jul	7.00	14.00
8 Aug	8.00	16.00
9 Sep	9.00	18.00
10 Oct	10.00	20.00
11 Nov	11.00	22.00
12 Dec	12.00	24.00

Fig 2.3 – Example data entry screen

To use the data set, it must be saved on to the disc. To do this, press the function key **f3**. You will see the following prompt:

File to save:

In response, type a suitable filename, eg **SALES RETURN**. The data will be stored on the disc, and the name **SALES** will appear on the top line to indicate the name of the current data set.

The graph-plotting program is selected from the main menu, so press **ESCAPE** to return to the menu. The question

Return to menu?

will appear. Pressing **Y** will return you to the ViewPlot main menu, while pressing anything else will leave you in the data entry screen. Note that if you return to the main menu without having saved your data set first, all the figures you typed will be lost, so **BE CAREFUL!**

Plotting the data

We now have a suitable set of data to plot. As we are not concerned with printing or dumping the chart at the moment, press **3** to choose the display option. Again, there is no need to press **RETURN** when selecting items on the main menu.

There are some decisions to make about the format of the graph before it is plotted. These include which screen mode to use, whether a border is required and what colours to use. As the current aim is to produce a chart with as little effort as possible, just type in the responses given below. The implications of these replies will be considered in the next chapter.

First, you are asked:

Enter screen mode (4 or 5)?

(The numbers in brackets may be slightly different.) Press the figure **4**. In reply to the next three questions, which are

Do you want default colours?

Do you want patterns?

Do you want a border?

press the **Y** key for 'yes'. None of the responses above requires the **RETURN** key to be pressed.

Then you will be asked:

Data/Format file name?

In response, give the name of our example data set: **SALES RETURN**. Next, you will be asked how you want the data to be plotted.

Do you want a Bar, Line or Pie graph?

Just press the first letter of the type of chart to select it, ie L, B or P. We will have a look at all three, so first press L (no need to press **RETURN** here). The figures are plotted as a line graph, with the labels for the X and Y axes as specified in the data set. When you have finished looking at the line graph, press the space bar. You will be prompted again for the data set filename and type of chart. You can display the sales as a bar chart or pie chart in this way.

When you have finished plotting the charts, press **ESCAPE**. This will return to the main menu.

You now know the general principles by which charts are produced by ViewPlot. For the rapid production of simple graphs, this knowledge will probably suffice. However, there are several advanced features which make ViewPlot even more useful, and these are explored in subsequent chapters.

3 More on data entry and plotting

In the previous chapter we saw how data is entered, saved in a file, and then plotted. This chapter looks at the finer points of these processes. In particular, it describes the use of the function keys during data entry and plotting.

Supplied with ViewPlot is a function key legend. This fits under the clear plastic strip above the red keys, and acts as an indicator of the actions performed by these keys in the various parts of ViewPlot. Here, we are concerned with data entry (option 1 on the main menu) and plotting; the actions of the function keys during format entry (option 2) are described in the next chapter.

Auto entry

When you are entering data, pressing **RETURN** automatically moves the long cursor to the next box along (or down). This is called auto entry, and is very useful for rapid entry of data. However, sometimes you may wish to prevent this action. For example, you may want to enter all of the Labels column first. To disable auto entry, press **f0**. Notice that the words Auto Entry are removed from the second line on the screen.

When auto entry is disabled, pressing **RETURN** will enter the current item into the box indicated by the long cursor, but the cursor will stay in the same position. Pressing **RETURN** on its own during data entry leaves the current entry unchanged, so to delete an item enter a space, followed by **RETURN**.

To switch auto entry back on, press **f0** again. Each time **f0** is pressed, the auto entry state is reversed.

Loading and saving

We saw in the previous chapter that pressing **f3** saves the current data set. Conversely, you may load in a previously saved data set by pressing **f2**. The prompt given is

File to load:

in response to which you should type in the name of an existing data set file. If the filename you type does not exist, or is not a valid data set, an error message is printed and you are invited to press the space bar to continue. Naturally, loading a data set destroys any figures you may have already typed.

If there is a current filename (ie you have already loaded or saved a file during this session), its name may be obtained automatically by pressing **COPY RETURN** to a load or save prompt. This is true for all load/save operations in the system.

After a data set is loaded, the long cursor moves to the Labels column in line 1. You may alter the data by changing entries (remember the cursor keys move the cursor around the table). By pressing **TAB** you can change the four labels. Pressing **TAB** again takes the cursor back to the lower window.

It is also possible to add new items to the data set, or delete existing ones, as described below.

Adding and removing data entries

The two function keys, **f6** and **f7**, are used to insert or delete a line of data from the data set. Pressing **f7** will remove the current entry from the data set. For example, to delete the last four months of our SALES data set, you would move the cursor to the SEP line and press **f7** four times.

Function key **f6** acts in the opposite way, and inserts a new entry at the current position. All items below the current one are shifted down. The new entry has an empty Labels column, and the X and Y entries are set to 0.00. When a new line has been created using **f6**, it may be filled in by typing entries as usual. Note that when using auto entry, new lines are created automatically, without the need to use **f6**.

Jumping to an entry

When there are a large number of data entries, it can be time-consuming to move to a particular entry using the cursor keys. To speed this up, you can use **f8** to go directly to an entry. The prompt given is

Entry number:

Reply with the number of the entry and press **RETURN**.

Reading ViewSheet files

When editing data, function keys **f4** and **f5** let you read files created using the ViewSheet spreadsheet program. This is an advanced feature of ViewPlot, and is described fully in chapter 5.

Issuing * commands

To issue * commands from ViewPlot's data entry screen, press **f1**. The screen will clear, and you will be prompted with a * character. This signifies that

anything you type will be treated as a * command. So, to issue a *CAT command, type

f1 CAT RETURN

After the catalogue has been produced, you will be prompted with * again. Thus you can continue typing * commands, without having to press **f1** each time. To return to the data entry screen, simply press **RETURN** on its own in response to the * prompt.

Erasing the data set

Once a data set has been created and saved, you may wish to start entering a new one. It would be tedious to have to delete the current data a line at a time using **f7**, especially if the data set is close to the limit of 100 entries. To delete all the data in one go, press **f9**. This acts as a NEW command, and destroys all of the previously entered data. Its effect is irreversible, and so you must confirm the command by pressing Y in response to the question

Erase data?

Pressing any other key will leave your data intact.

The plot screen mode options

In the interests of brevity we avoided detailed discussion of the four questions asked by the display program in the previous chapter. Now is the time to explain their meanings properly.

Screen modes

First, you are asked which screen mode should be used, with the question:

Enter screen mode (4 or 5)?

or

Enter screen mode (0,1,2,4 or 5)?

Which variant you see depends on the computer you are using. If it is a BBC Microcomputer Model B, the former will appear. If it is a Model B+, Model B+128K, Master 128 or you are using a 6502 Second Processor, the second form of the question will be asked.

The five display screen modes give varying degrees of detail (called resolution) and colours on the screen. Resolution is measured by the number of dots or pixels displayed horizontally and vertically. The resolution and colours of the five screen modes are:

Mode	Horizontal	Vertical	Colours
0	640	256	2
1	320	256	4
2	160	256	8
4	320	256	2
5	160	256	4

When choosing the screen mode, you must decide whether the chart requires high resolution or many colours. Line graphs look best in the higher resolution screen modes, whereas pie charts benefit from more colours. Bar charts lie somewhere between. Experimentation will provide you with the most suitable screen mode if you are not sure.

Plotting colours

The next two prompts relate to the way in which the bars of bar charts and the sectors of pie charts are plotted. As mentioned earlier, it is possible to use patterns instead of solid colours when plotting bar and pie charts, and a default set of patterns is provided.

If you are happy with the default set of colours and patterns provided, then you should reply with Y or y to the prompt:

Do you want default colours?

You will then be asked whether you want to use patterns or not. If, however, you want to use your own colour file, then answer with N or n to the above prompt. You will then be asked:

Colour file name?

and should give the name of a pattern file you previously prepared using the editor. Chapter 6 describes the pattern editor in detail. It is assumed that, if you load a colour file, then the patterns in the file are to be used, and the next prompt is not given.

If you answered in the affirmative to the previous question, you will be asked:

Do you want patterns?

If you press Y or y then, whenever the supply of solid colours is exhausted, the patterns will be used. To illustrate this, plot two pie charts using the SALES data set and using screen mode 5. The first time, answer N to the current prompt, then Y the second time. In the first graph, the 12 sectors alternate between the two colours available – red and yellow. The second chart uses patterned colours. The first two colours are solid red and yellow, but the next ten are genuine patterns made from red, yellow, black and white.

Screen border

The last prompt displayed by the plotting program is

Do you want a border?

If you require a white box to be drawn around the edges of the chart, press Y or y. If not, press N or n. A border often makes the chart look neater, especially on a printer dump.

Changing the colours of a graph

When a chart has been plotted using the display option (number 3) on the main menu, it will be displayed until you press the space bar. While it is being shown the function keys may be used to change the colours, and print or dump the chart to disc.

Changing colours

You may alter the colours which are used by pressing functions keys **f0** to **f7**.

As the screen mode chart above shows, there may be two, four or eight colours on the screen at once. This can be regarded as a background (which starts as black) plus one, three or seven plotting colours. To change the actual colour used for the background while the chart is being displayed, press **f0**. Every time it is pressed, the next colour in the sequence black, red, green, yellow, blue, magenta, cyan and white is displayed. After white, the cycle repeats with black.

The other colours can be changed in the same way, using the other function keys. In the two-colour screen modes (modes 0 and 4), **f1** changes the single plotting colour. In the four-colour screen modes (1 and 5), **f1** to **f3** are used, and in the eight-colour screen mode 2, **f1** to **f7** are used to change the seven plotting colours. Assuming that no two colours are the same, there are 56, 1680 and 40,320 colour combinations for the various screen modes.

Dumping and printing

Using option 3, when the graph has been drawn, pressing **f8** will save the screen to disc as a file named 'Image'. Pressing **f9** will cause the screen to be 'dumped' to an attached printer. You should ensure that the printer is connected and set up correctly, because if it is not, the computer will 'hang', as indicated by the **CAPS LOCK** and **SHIFT LOCK** lights glowing faintly together, and pressing **BREAK** may be necessary.

Option 4 is almost the same as option 3 except it dumps each chart to the printer automatically, just as if you had pressed **f9** after each one.

Screen dumps may be loaded later using the LoadDump utility supplied with ViewPlot. For example, to reload the file 'Image', type

***LoadDump Image**

This utility restores the mode and palette to those of the saved image.

Technical notes

Readers wishing to provide their own printer or screen dump program should note that the program should be assembled to run at address &FFFF2800 (ie always in the IO processor). The names should be **Pr tDump** and **DisDump** respectively. The routines may be up to &200 bytes long.

The supplied disc dump routine uses the load and execution addresses of the saved file to encode the mode and palette information. Hence a simple ***LOAD** command will not load the file correctly.

Users of BBC Microcomputers which incorporate shadow screen memory should note that the use of the LoadDump utility will result in the screen image being displayed in a non-shadow mode.

4 Format files

So far, we have only drawn single graphs. That is, the plots we have made have consisted of just one chart on the screen, using a single set of figures. The format file facility provides three enhancements over this simple technique:

- Up to four plots may appear on the screen at once, enabling a set of figures to be shown in different ways, or several data sets to be compared.
- Several sets of figures may appear on the same line graph or bar chart, again enabling comparisons to be made directly.
- Charts may be chained together to form a sequential presentation of graphs.

The image shows a terminal window titled "Format File" with a dark background and white text. In the top right corner, it says "Charts: 1" and "Auto Entry". The main area contains a table with the header "Data sets 1" and a list of numbers 1 through 10 on the left. Below the table are two input fields labeled "Chart titles" and "Chain", both with a "1" to their left.

Data sets 1	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

1

Chart titles
1

Chain
1

Fig 4.1 – Blank format edit screen

Creating format files

To use a format file, it must first be created. To do this, select option 2 (Select charts) from the main menu. The format file program will be loaded, and you will be presented with a screen quite like that used when editing data. This is shown on the previous page.

Certain elements will be familiar by now: the message indicating auto entry, the long solid cursor denoting the current slot, and the small flashing cursor where typed characters appear.

On the top line, the words **Format File** remind us of what we are doing, and are followed by the name of the current format file, if any. On the right is an indication of the number of charts to be displayed by this format file. There may be one, two or four. When two charts are displayed, the screen is split vertically, with a graph on the left and one on the right. If four charts are being displayed, the screen is split both horizontally and vertically, each chart occupying about a quarter of the screen.

The main box, in which the long cursor resides initially, contains the names of the data sets to be plotted, and shows how they appear in each graph. There may be up to ten data sets in one format file, hence the ten rows in the box.

Plotting more than one graph

As we have a convenient data set called **SALES**, we will use it to illustrate how two graphs may be shown on the same screen. First, we have to indicate that there will be two graphs on the screen. Press **f8**. The Chart titles line will change to 2.

The name of the data set file is entered in the column which is labelled Data sets, so type **SALES RETURN**. The cursor will move on to the next column (as we are using auto entry).

Next, we have to indicate how the data is to be displayed on each graph. To plot chart 1 (which appears on the left of the screen) as a bar chart, type **B RETURN** in the column marked 1 on row 1. Chart 2 will be a pie chart, so move the cursor to column 2 on row 1, and type **P RETURN**. Predictably, if we wanted a line graph, we would use **L RETURN**.

That is all that is required to plot **SALES** as a bar chart and pie chart. Save the format file by pressing **f3**. In response to the prompt

File to save:

type **FORMAT RETURN**.

After the format file has been saved, return to the main menu by pressing **ESCAPE**. As for the data entry screen, you must confirm this by pressing **Y** in response to the question

Return to menu?

Pressing any other key leaves you in the format edit screen.

Now press 3 for the display charts option.

When more than one chart is displayed, screen mode 0 (or 4 if 0 is not available) is often the best screen mode to use, as it shows the finest detail. Press 0 (4) for this screen mode, and, in response to the other prompts, give your preferences. Finally, type the name of the format file we just created: **FORMAT RETURN**.

On the left, a bar chart of the **SALES** data set is displayed; on the right is a pie chart using the same figures. As before, the function keys may be used to change the colours, and to obtain a hard copy of the graph on a suitable printer.

Plotting multiple data sets

In addition to plotting a data set in various ways, format files may also be used to show several sets of figures on the same bar chart or line graph. Before we can use this facility, another data set file must be created. Let us plot **SALES** and another data set called **TARGETS** on a single bar chart.

By now you should be able to use option 1 on the main menu to create and save a data set called **TARGETS**. In fact, you will only need to fill in the **Y** column for this data set as the labels column will be taken from **SALES**, and the **X** column is not used in bar charts. So, create **TARGETS** with 12 **Y** entries in a suitable range (say between 0 and 50). Again, there is no need to fill in the various labels in the top box – **SALES** will be used for these.

Having saved **TARGETS**, return to the main menu and choose option 2 (Select charts). This time, there will only be one graph on the screen, so there is no need to press **f8** to increase Charts. However, there are two data sets which we will display as bar charts. First type **SALES RETURN**, and then **B RETURN**. Now move the long cursor to row 2, below **SALES**, and type **TARGETS RETURN**, followed by **B RETURN**.

Now we discover the reason for the box labelled Chart titles. We are showing two sets of figures on one chart, and either of these set's title could be used to label the composite chart. When more than one data set is displayed on a single chart like this, the title in the appropriate Chart titles row is used instead.

To give our composite bar chart a name, press **TAB**. The long cursor will move into the first row of the Chart titles box. Type **Sales/Target RETURN**. This completes the production of the new format file. Save it using **f3**, with the name **FORMAT2**.

The new graph can be plotted in the way previously described, using any available screen mode. You may like to experiment with the data and format file you have created. For example, you could change **FORMAT2** to show the data sets as superimposed line graphs instead of bar charts (by changing the entries in column 1 to L). Before you can plot **TARGETS** as a line graph, you must fill in the X column with the month numbers 1, 2, 3 etc. You might also like to try a format file which has four charts (use **f8** to increase the number of charts to 4).

We have now seen the major aspects of format files. The remainder of this chapter discusses the finer points, such as chaining format files together.

The function keys when editing the format file

The red function keys behave in similar ways to within the data editing screen. In particular, the following keys have exactly the same effects:

- f0** – Disable/enable auto entry
- f1** – Enter * commands
- f2** – Load a (data/format) file
- f3** – Save a (data/format) file
- f9** – New (clear the current format)

The only other function key that has an effect when editing the format file is **f8**. As we have seen, this changes the number of charts to be displayed by this format file. Each time it is pressed, the number of chart titles on the top line changes to the next number in the sequence 1, 2, 4, 1, ... Additionally, the top box's columns and the bottom box's rows are labelled to reflect the number of charts.

Chaining files

As mentioned at the start of this chapter, several multiple-chart displays may be chained together to form a graphic slide show. The box marked Chain contains the name of next format file in the sequence. If it is blank for a given format file, pressing the space bar when that file's chart has been displayed will return you to the main menu.

To fill in the Chain entry for format file, press **TAB** to move the cursor into the Chart titles box, then press it again to move it into the Chain box. Type the filename of the next format file, followed of course by **RETURN**. Pressing **TAB** once more will move the cursor back to the upper box.

Note that it is perfectly all right to cite the first format file in a sequence as the chain file for the last file. For example, **FORMAT1** might chain **FORMAT2**, which chains **FORMAT3**, which in turn chains **FORMAT1**. In this case, pressing the space bar would never take you back to the main menu (but **ESCAPE** would, of course).

Rules for multiple data sets

In this section we specify formally how to predict the results when more than one data set is plotted on a single chart.

When a pie chart has more than one data set specified for it, only the first one is used. That data set's Labels column is used (with the entries truncated to three characters) to label the sectors, and the sizes of the sectors are derived from that data set's Y column. If P occurs for the same graph in other rows farther down, it is ignored.

Many data sets may be associated with a single bar chart. In theory, all ten data sets may be displayed on the same chart, but in practice the clarity of the chart suffers unless only a small number of bars are used. The Labels column for the first data set mentioned for the bar chart is used to label all of the bars. The number of characters used depends on the number of entries in the biggest data set (and the screen mode). The higher the number of entries, and the lower the resolution of the screen, the smaller the number of characters used.

Several sets of figures may be used on a single line graph. Again, the upper limit depends on how much clarity is required, and what the resolution of the screen is. Screen mode 1 uses three colours to distinguish between up to three sets of figures. After that, the colours are duplicated. The scaling of the axes uses the widest ranging of the X and Y values for the data sets plotted on the graph.

Note that it is only sensible to overlay graphs of the same type (eg two bar charts or two line graphs). ViewPlot will not prevent you overlaying different types, but the results are unlikely to be what you wanted!

5 Using ViewPlot with ViewSheet

As mentioned previously, ViewPlot graphs may use data prepared using the ViewSheet spreadsheet program. Such data is read when a data set file is created using the data editor (option 1 on the main menu). There are two ways in which ViewSheet files may be incorporated into a data set: spool files created by the *SP00L command, and link files made by the ViewSheet CREATE command. We will deal with each type of file separately here.

This chapter assumes that the reader is familiar with the use of ViewSheet, eg defining print windows, though where necessary the ViewSheet key sequences are described.

The *PREPARE utility

When editing data, function key **f5** can be used to read data which has previously been *SP00Led from ViewSheet. A command file called *PREPARE does most of the work for us. *PREPARE is on the ViewPlot disc and may be used whenever that disc is in the drive.

Preparing the ViewSheet file

Before a ViewSheet table can be *PREPARED, it has to be in the correct format. In particular, there should be no top or side borders present. As an example, we will prepare a sheet which duplicates the SALES data set created in chapter 2. Enter ViewSheet using *SHEET as usual.

The SALES sheet will have 12 rows and three columns. Type the first entry at slot A1. The columns are the Labels, X and Y entries used in the data set editor. Thus at A1 enter Jan, at A2 enter Feb and so on. At B1 enter 1 (the month number), and at C1 enter 2 (twice the month number). The last entry, at slot C12, will be the Y entry for December, and should contain 24. (If you are adept at using ViewSheet, you could doubtless speed up the entry of the information using the ROW function and the relative replicate facility.)

When all 36 slots have been entered (you may find ViewSheet's auto entry helpful here), we must change the print window to remove the borders and unused rows and columns. Press Edit window, then **P0 RETURN** for printer window zero. Using **CTRL →**, move the edit cursor to the BotR entry for the window. Change this to C12, the bottom right-hand slot of our data. Then move the cursor to the Opt entry, and type **TS**. This removes the Top and Side

borders. Press **RETURN** to update the window definition. Of course, the sheet on the screen does not change, as it was a printer window we updated, not a screen window.

To see the effect of the change, go to the command screen and enter **SCREEN RETURN**. You will see that just the 36 cells of our table are printed. Still in the command screen, and with the ViewPlot disc in the drive, type the command

***PREPARE VSALES**

This prepares the ***SPOOL** file called **VSALES** which can subsequently be read using **f5** in the data editor.

Reading the ***SPOOL** file

Enter ViewPlot as described in chapter 2. Select Edit data from the main menu. Press **f5** to read the ***SPOOL** file. You will be prompted:

File to read:

Type **VSALES RETURN** in reply. Next you will requested for the:

Data format:

The answer to this is a digit between one and seven. The digit gives the format of each row in the ***SPOOL** file. The meanings are:

Digit Items expected on each row

- | | |
|---|-------------------|
| 1 | Y val |
| 2 | X val |
| 3 | X val Y val |
| 4 | Label |
| 5 | Label Y val |
| 6 | Label X val |
| 7 | Label X val Y val |

So, if the ***SPOOL** file contains lines of single figures which we want read into the Y column, format 1 would be used. Similarly, if there were two columns to be read into the Label and X columns respectively, format 6 would be used. In the present example, all three columns are present, so we use 7. There is no need to press **RETURN**.

The data is read in, and the data display updated to show the new data.

Obviously this example was a little contrived, as we could have entered the data much more quickly by typing it directly, as shown in chapter 2. However, for existing spreadsheets, it provides a very straightforward way of

transferring data from ViewSheet to ViewPlot. The key points to remember are the ordering of the columns – ViewPlot expects them in the order Label, X, Y – and the correct setting of the printer window before *PREPARE is used.

ViewSheet link files

The second way of transferring data from ViewSheet to ViewPlot is through link files. A link file is created from ViewSheet and is accessed through the functions READ and WRITE in the spreadsheet. A detailed description of the use of link files may be found in the ViewSheet User Guide. Here, we will restrict the discussion to aspects which are relevant to ViewPlot.

Creating a link file

Before a link file can be read from ViewPlot, it must be created and written to from ViewSheet. Enter ViewSheet and type the command:

```
CREATE 1 2 10
```

This creates a file called V.VS1 (the 1 after CREATE being the figure at the end of the file name), and with the dimensions of two columns by ten rows. Thus there are 20 entries in V.VS1 which may be written from the spreadsheet.

Now we have to design a sheet which contains references to the link file. To do this, press **ESCAPE** to enter the sheet screen. Our spreadsheet will have two columns and ten rows. Each slot in the sheet will contain a WRITE function to the corresponding cell in the link file. The first column, A, will write X values, and the second column, B, will write the corresponding Y values.

The format of the WRITE function is:

```
WRITE(file,column,row,value)
```

where file is the link file number, column and row are the coordinates of the link cell to be written, and value is the value to be written there. This last is also used as the value for the slot (as displayed on the screen), a fact we will use in this example.

The column of X values will simply contain the row number. With the slot cursor at A1, type the line **WRITE(1,COL,ROW,ROW) RETURN**. This writes the value ROW (which is 1) to cell (1,1) in the link file V.VS1. To complete the column, the replicate command is used thus: **f0 A1-A2A10 RETURN**. So, each slot in column A contains a WRITE to the corresponding cell in the link file, the value written being the row number in the range from one to ten.

To create the column of Y values, move the slot cursor to B1. Enter the line **WRITE(1,COL,ROW,A1*A1) RETURN**. This time, the value written to

link file is the square of the value in A1. Again, COL and ROW are used to access the cell in the link file corresponding to the spreadsheet slot. Complete the column using the following: **f0 B1-B2B10 RETURN R R**. The Rs are for relative replication for the two references to A1 in the WRITE function.

We now have a spreadsheet containing 20 entries which are written to the link file. Press **ESCAPE** to enter the command screen. You can save the sheet at this point if you want to use it later, but the link file has already been set up, so it is not vital.

Reading the link file

Call up ViewPlot as described in chapter 2. Enter Edit data by pressing 1. Function key **f4** is used to read a link file, so press this. You will be asked:

Link file:

Type the name of the file we just created: **V.VS1 RETURN**. The screen will clear, and you will be asked a series of questions on how the file is to be read. The dialogue below shows the messages printed by ViewPlot, with the replies you should type underlined.

The file is 2 columns by 10 rows

Do you wish to read a column or a row?

Enter (C/R) C

Which column do you wish to read from

Enter number (1-2) 1 RETURN

Start Row

Enter number (1-10) 1 RETURN

Finish Row

Enter number (1-10) 10 RETURN

Do you wish to read this as X or Y data

Enter (X/Y) X

From the above, you can deduce that we have read the whole of the first column of the link file into the X column of the data set. To read the second column of link file into the Y data column, use another **f4** command. The responses differ in that you tell ViewPlot to read column 2, and read it as Y data.

In the example above, we read complete link file columns into a currently empty data set. What happens when we read partial columns and/or the data set already has values in it? Suppose we asked to read rows 4 to 7 of column 1 of the link file into the X column. Although reading starts from the fourth link file row, it is always the first data set row which is altered first. Thus cell (1,4) of

the link file would be read into row 1 of the X column and so on until cell (1,7), which would be read into row 4 of the data set X column.

If the data set contains data already, the existing values are overwritten by the values read from the link file, but other entries remain unaltered. If it is necessary to increase the length of the data set to accommodate the new data, this is done automatically.

As in the previous section, the example described has been rather contrived. However, using the information given here, you should be able to incorporate link files into existing spreadsheets, which may then be plotted using ViewPlot. The advantage of link files is, of course, that the data contained in them is updated automatically when the sheet is altered, so graphs plotted from link files are guaranteed to be up to date.

6 Using the pattern editor

This chapter describes the pattern editor. You will not need to use it very often, if at all. The editor enables you to change the patterns which are used to fill areas of pie charts and bar charts, in order to give the appearance of more colours on the screen. Only if you are unhappy with the patterns already provided will you need to use the editor.

Entering the pattern editor

To enter the pattern editor, enter the main menu and press 5. You will then be asked:

Enter screen mode (0,1,2,4 or 5)?

or

Enter screen mode (4 or 5)?

Which of the messages is displayed depends on your computer type, as explained in chapter 3. The screen mode is required because the number of colours and size of patterns varies according to the screen mode. For example, in screen modes 0 and 4, a pattern is an eight by eight grid of dots, each of which can be set to one of two colours. In mode 1, however, a pattern is a four by eight grid of dots, each of which may be set to one of four colours. When a large area is filled using a pattern, the small grid is repeated over the area.

An example session

As usual, we will describe the editor by presenting a typical session using it. In response to the screen mode request, press 4. Screen mode 4 is medium resolution with two colours. The screen will show the display reproduced on the next page.

Apart from the lines of text at the top, three areas of the screen stand out. The large area in the middle, an eight by eight grid, is the editing area. This is where the pattern is defined in large scale using the cursor keys and the numeric keys. The editing cursor is the square within the top left-hand cell.

Above the editing area is a rectangle filled with the current pattern. This preview rectangle is constantly updated as the pattern is edited. It reflects what a histogram bar or pie chart segment would look like if filled with the current pattern.

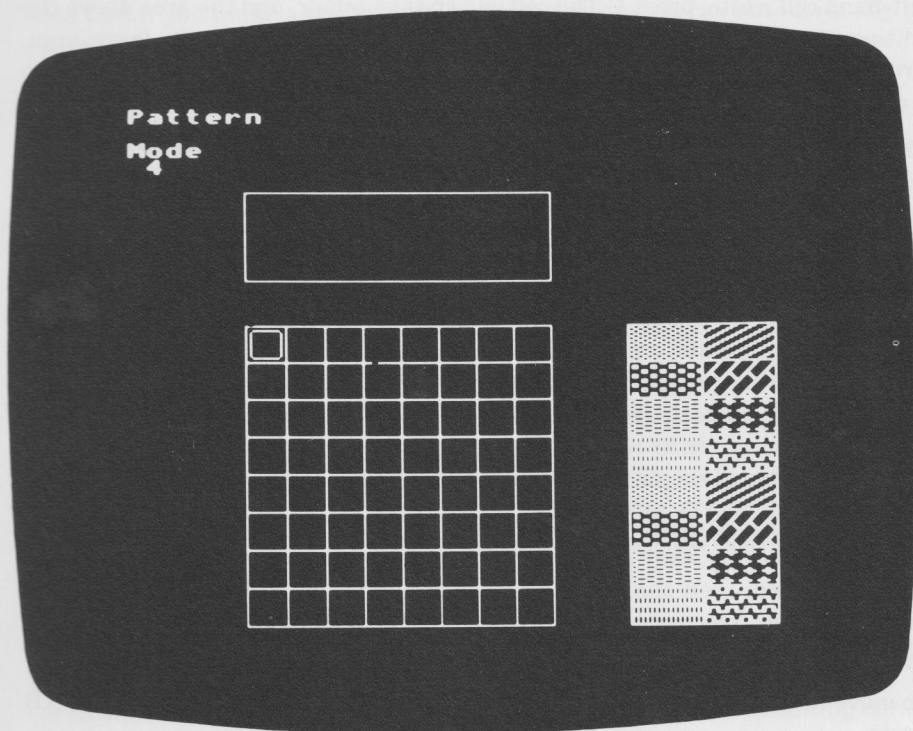


Fig 6.1 – The mode 4 pattern screen

To the right is an area showing 16 patterned areas. This is the pattern file. Each pattern file contains 16 patterns. Thus when, say, a bar chart is plotted using patterns (as opposed to solid colours) in screen mode 1, there are 16 colours available, compared with the usual two. As we will see later, any of the patterns in the pattern file may be copied into the editing area so that it can be altered. Similarly, the editing pattern may be used to overwrite any one of the patterns in the file.

Changing the edit pattern

At first, the editing area is black, ie all of the 64 cells in the grid are set to the background colour. Editing the pattern merely involves changing selected cells to produce the required effect. As we are in screen mode 4, there are two colours available. These are black and white, and are given the numbers 0 and 1 respectively.

To change the colour of the cell occupied by the editing cursor, simply press the key corresponding to the required colour. For example, to make the top

left-hand cell white, press 1. The cell will change colour, and the area above the editing area will change to reflect this pattern repeated over a large area. Pressing 0 will change the cell back to black. (In other screen modes, digits 0 to 3 or 0 to 7 are used, as appropriate.)

The cursor keys are used to move the edit cursor around the editing area. The action of the keys are as usual, with ↓ moving the cursor one cell down and so on. Using the cursor keys in conjunction with digits, it is possible to create any desired pattern within the eight by eight grid.

Updating the pattern file

Once you have created a pleasing pattern, you will want to save it for later use. The first step in doing this is to copy the editing pattern into one of the 16 entries in the pattern file. Press **TAB**. The edit cursor will move into the pattern file area. It is not always easy to see the cursor on a patterned background, but a couple of cursor movements will reveal its presence.

Move the cursor to the pattern file entry you wish to alter. When the patterns are used in plotting, they appear in the following order: the top left-hand one is first to be used, then the top right, then the left-hand pattern on the second line, and so on. To copy the edit pattern to the pattern file, press **RETURN**. The pattern at the cursor position will change to that in the preview rectangle.

To move the cursor back to the editing area, ready for more editing, press **TAB** again.

Saving the pattern file

When **TAB** and **RETURN** are used to update the pattern file, only the copy of the file loaded into the computer's memory is affected. To make the change a permanent one which will be reflected in later plots, the pattern file must be saved on to the disc. As usual, **f3** is used to save the file.

On pressing **f3** you will see the message:

File to save:

In response, type a memorable filename. This is the filename which you will be asked for in the plot program if you indicate that you do not want to use the default colours. The default pattern files supplied on the ViewPlot disc are called col04, col15 and col2. These are used for screen modes 0 and 4, 1 and 5, and 2 respectively. You should not use these names when saving your own pattern file, as you will lose the default patterns. A suitable name is mycol04 or similar.

Note that if you make a pattern file for screen mode 4, it can automatically be used to provide an identical pattern in screen mode 0. Similarly, screen mode 1 and 5 patterns are interchangeable.

Other facilities

The function keys

We have already seen the use of **f3** to save a pattern file. Other function keys which may be used from the pattern editor are: **f1** to issue a ***** command, and **f2** to load a pattern file.

The use of **f1** is exactly as described in chapter 3.

Function key **f2** is used to load a pattern file from disc into the editor. This is done automatically when the editor is called, using the default pattern file which is appropriate to the selected screen mode. After making your own pattern file based on the defaults, and having saved it with **f3**, you might want to reload the default file and start again. To do this, type: **f2 c o l 0 4 RETURN** (assuming screen mode 0 or 4). The pattern file display will be drawn using the default patterns.

The COPY key

The **COPY** key has the opposite effect to **RETURN** in the pattern editor. To see this, load the default pattern file, and press **TAB** to move the editing cursor into the pattern file area. Press **COPY**. The pattern file entry under the cursor will be copied into editing area and preview rectangle. Pressing **TAB** again enables you to alter the pattern. This facility can save time when you want to create a pattern which is very similar to an existing one.

Other screen modes

Using the editor in the other screen modes is much the same as using it in screen mode 4. The only differences are the number of colours and number of cells in the editing grid. The table below gives these figures for each mode:

Mode	Grid	Colour keys
------	------	-------------

0	8 X 8	0 and 1
1	4 X 8	0 to 3
2	2 X 8	0 to 7
4	8 X 8	0 and 1
5	4 X 8	0 to 3

There is nothing to stop you loading, say, a mode 0 pattern file into the editor when it is in mode 2. In general though, the patterns will look pretty silly and will not be very useful.

Leaving the editor

As usual, the **ESCAPE** key is used to leave the editor and return to the main menu. As always, you should ensure that any patterns which will be needed later on are saved before you press **ESCAPE**, but ViewPlot will in any case ask you to confirm your choice.

7 Errors in ViewPlot

There is plenty of scope for making mistakes when using ViewPlot. Luckily, the program is very tolerant of human error, and usually prints a message indicating the fault and carries on. When the error is particularly trivial, such as typing a number out of range, you will usually be asked again for the input without any other message.

In this chapter we list the error messages produced by the five main components of the ViewPlot suite, and explain their meanings.

Main menu errors

Graphics Extension ROM active, please press BREAK

This is given when you first call ViewPlot. The program contains its own graphics routines, and the ones in the Graphics Extension ROM clash with them. Thus the GXR must be disabled before ViewPlot can be used.

ViewPlot will not work with

An operating system version number is printed after 'with'. If you are using an operating system which is not compatible with ViewPlot, your dealer can supply you with the correct one.

Pattern file not found

This occurs when the program tries to load in a pattern file, and cannot find it. It could be because you have typed the wrong name when asked for a pattern filename, or because the default pattern files are not on the disc.

File is not a pattern file

If a named pattern file is found, but is not of the correct format, this error is generated.

Data editor errors

Data set not found

This is given when you specify a filename which does not exist in the load (f2) command. Usually caused by a mistyping of the name, or having the wrong disc in the drive.

File is not a data set

This is also given during a load command. The filename you typed exists, but is not a legitimate data set, as created by the editor. Sometimes caused by confusing data set and format files.

Spool file not found

When you try to read in a *SP00L file which does not exist (in an f5 command), this error will be given. Ensure that the name you give is the same as that used in the *PREPARE command.

Link file not found

Similarly, when you try to read a link file (f4), this error will be given if the filename you gave does not exist on the disc. Check spelling and that the disc is the correct one.

Not a Link file

The file you specified exists, but is not actually a link file as created by the ViewSheet CREATE command. Avoid getting confused between link files and *SP00L files.

Format editor errors

Format file not found

File is not a format file

Both of these are given in the load command. The first means the specified file just did not exist at all, and the second implies that the file was found, but was not a format file (it might have been a link file or data set, for example).

Graph plotter errors

Data/Format file not found

When you type the name of the data/format file, this error is given if the file cannot be found on the disc.

This is not a Data/Format file

This error occurs when the file has been found, but turns out not to be a data file or format file. To avoid confusion between file types, it is advisable to use separate directories, eg D for data, F for format.

Format file not found

This is not a format file

These errors occur when the next format file in a list of chained formats either cannot be found, or is not a valid format file.

Data set *filename* not found

File *filename* is not a data set

These errors are given when one of the data set files in a format file list either cannot be found, or is not a valid data set. The name of the file is given so that the format file can be checked and corrected.

Negative Y data in Pie chart

All values plotted in a pie chart must be positive. This error is printed when a negative Y value is encountered in a pie chart plot.

Pie chart data sum too small

To produce accurate results, the sum of all the Y values in a pie chart must be greater than a certain value. If it is not, this error is printed. In practice, it should never be encountered.

Pattern editor errors

Pattern file not found

File is not a pattern file

These errors relate to the non-existence or invalidity of a pattern file named in the pattern editor's load file command.

Index

- * commands 4,11
- *LoadDump 15
- *PREPARE 21-22
- Adding data entries 11
- Auto entry 10
- Bar charts 6
- Border 14
- Chaining files 19
- Changing data labels 11
- Changing graph colours 14
- Changing patterns 26-30
- Changing the chart title 6,18
- Chart titles 18
- Chart types 6
- Choosing chart type 8,17
- Choosing data sets 18
- Choosing numbers of charts 17
- Colour files 13
- Colours and patterns 13,29
- Combining data sets (composite charts) 18,20
- Conventions 2
- Copying from the pattern file 29
- Copying to the pattern file 28
- Correcting data entries 6
- Creating a format file 17
- Creating a ViewSheet link file 23-24
- Current filename 11
- Cursors 6
- Data entry 4,6
- Data entry screen 4,5
- Data entry window 5
- Data set 4,5
- Default pattern files 28
- Display charts (option 3) 14
- Displayed colours 14
- Dump plot to disc 14-15
- Dump plot to printer 14
- Edit data (option 1) 4-6
- Editing data entries 4-6
- Editing patterns 26-30
- Entering data 4-6
- Erasing a data set 12
- Error messages 31-33
- Format edit screen 16
- Format files 16-20
- Function keys 10
- Histograms 6
- Jump to data entry 11
- Labels 5,6
- Line graphs 5
- Load data set 10
- Load pattern file 29
- Loading a screen dump 15
- Loading ViewPlot 3
- Main menu 3-4
- Messages 31-33
- Pattern editor (menu option 5) 26-30
- Pattern files 13
- Pattern files supplied 28
- Patterns 13
- Pie charts 6
- Plot options 12-14
- Plotting a data set 8-9,12
- Plotting multiple charts 17
- Plotting multiple data sets (composite charts) 17,18
- Plotting ViewSheet data 21-25

Positioning charts on the screen 17
Print 14
Print charts (option 4) 14
Removing data entries 11
Return to main menu 8,9,18,30
Rules for composite charts 20
Running ViewPlot 3
Save data set 7,10
Save format file 17
Save pattern file 28,29
Save plot 14-15
Screen border 14
Screen colours 12
Screen dump 14-15
Screen dump format 15
Screen layout 17
Screen modes 12
Screen resolution 12
Select charts (option 2) 16-20
Selecting menu options 4
Slide show 19
Starting ViewPlot 3
Status information 4
Superimposing charts 18-20
Typefaces 2
Types of graph 5
Typing * commands 4,11
Updating the pattern file 28
User printer dump 15
User screen dump 15
Using a ViewSheet link file 24-25
Using data from ViewSheet 21-25
Using patterns 13
Using ViewPlot 3
ViewPlot disc 3
ViewPlot menu 3
ViewSheet 21-25
ViewSheet *SPOOL file 21-23
ViewSheet link file 23-25

Writing printer dump programs 15
Writing screen dump programs 15
X-axis name 6-7
Y-axis name 6-7



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